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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,737	07/06/2004	Yasuo Imamura	254914US0PCT	6688

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EXAMINER	
LIAO, DIANA J	

ART UNIT	PAPER NUMBER
4116	

NOTIFICATION DATE	DELIVERY MODE
11/02/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/500,737	IMAMURA ET AL.	
	Examiner	Art Unit	
	Diana J. Liao	4116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *06 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) *1-3 and 9* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4-8* is/are rejected.

7)☒ Claim(s) *5* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/6/04 and 10/4/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 1-3 and 9 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 9/24/2007. therefore, restriction is deemed to be proper and made **final**.

2. Applicant's election without traverse of invention II in the reply filed on 9/24/2007 is acknowledged.

Status of Application

3. Claims 4-8 are presented for examination. Claims 1-3 and 9 have been withdrawn due to being the non-elected invention.

Priority

4. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/JP03/00158, filed on 1/10/2003.

Information Disclosure Statement

5. The information disclosure statement (IDS) was submitted on 7/6/2004. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the

information disclosure statement is being considered by the examiner.

6. The information disclosure statement filed 10/4/04 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because it does not supply a space for the examiner to initial each document considered (37 CFR 1.98 (a)(1)(ii)). Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

Claim Objections

7. Claim 5 is objected to because of the following informalities: The wording of this claim is cumbersome. The phrase at the end of the claim, "...the oxidation *of the gas capable of oxidizing the monosilane gas*," is particularly unclear. The examiner has disregarded the words in italics, with the reasoning that the phrase either does not change the meaning of the claim without it, or because its meaning is not easily interpreted. Appropriate correction is required.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumar, et al. (US 6,726,990) in view of Golecki (US 6,896,968).

Kumar, et al. teaches the formation of silicon oxide particles with a stoichiometry of SiO_x where $1 \leq x \leq 2$. (col 2, lines 54-55) It is stated that these particles can have a purity of 99.9 wt percent. (col 9, lines 40-43) It is also more specifically stated that the particles contain less than about 0.00001 percent by weight metal. (Kumar, et al., claim 5) The surface area of the example product is 264 m^2/g. (col 12, lines 27-30) The temperature that is disclosed to be appropriate for processing is 50-800°C. (col 8, lines 36-38) These particles are created using an oxidation reaction between the vapor of $SiCl_4$ and an oxygen source, such as oxygen. The reaction is heated through use of a laser and a radiation absorber, in this case ethylene. This process also utilizes an inert atmosphere of argon, which also serves as a carrier gas. The pressures used in the examples range from 180-360 torr, or about 25-50 kPa. (col 11, Table 1)

Kumar, et al. differs from the instant claims because it does not teach a SiO_x powder where x is from 0.6 to 1.8 with a total content of Na, Fe, Al, and Cl amounting to at most 10 ppm. The pressures disclosed in Kumar, et al. also does not completely anticipate the pressure range of 50-300 kPa. Kumar, et al. also does not use SiH_4 in its method nor a molar ratio of the non-oxidizing gas to gases in the oxidation process to be at least 2.

However, it would still be obvious to one of ordinary skill in the art to make the necessary changes to meet these limitations using common knowledge in the art and in view of Golecki.

Regarding the use of SiH_4 instead of $SiCl_4$, Golecki teaches a coating made of non-stoichiometric silicon oxide and this coating can be made of SiO_x, where $x<2$ (col 2, lines 36-48) and mentions the possible precursor of SiH_4. (col 3, lines 46-47) Kumar, et al. made its choice based on vapor pressure. (col 3, lines 31-36) Given this reasoning, it would have been obvious one of ordinary skill in the art to use SiH_4, which exists mainly in gas form at the conditions for this process.

The pressures given in the examples in Kumar, et al. do not reach the range of 50-300 kPa. However, the pressure of 50 kPa, does touch upon this range. The specification of the instant application does not convincingly discuss the merits of the pressure range 50-300 kPa, but only the range 10-1000 kPa, which the pressure of Kumar, et al. does fall into. In addition, Kumar, et al. teaches that the precise conditions, including temperature, concentration of gases, pressure, and time can be

changed depending on the specific product desired. The range of 50-300 kPa is not considered patentable over the cited reference.

SiO_x powders that are less than the stoichiometric silicon oxide of SiO_x, such as the ones in the instant application and Kumar, et al., are obvious variants of one another. Though the cited reference does not teach the same range as the instant application, the main steps of the process are the same. One would have been motivated to make such a modification because in order to achieve a lower ratio, one could for example change the residence time of the gas in the reactor by imposing a faster flow.

Though the impurity content of Na, Fe, Al, or Cl is not discussed in Kumar, et al., the general purity that is taught is very high, and the metal impurity is very low for metals, ruling out sodium and iron. That characteristic is considered to be either inherent, or at least easily attainable using the process disclosed in Kumar, et al.

The molar ratio of non-oxidizing gas to oxygen in Kumar, et al. varies from 2.6 to 5.2. However, the amount of silane is not given. Assuming the ratio of Si to O is 1 to 1 (yielding an average of SiO) then the ratios range from 1.75 to 3.5 in the examples given in Kumar, et al. This is considered to read upon the claim of a range of a molar ratio of at least 2, as stated by claim 5 of the instant application.

Therefore, claims 4-8 are not found patentable over prior art.

Conclusion

Claims 4-8 have been rejected. No claims have been allowed. Claims 1-3 and 9 were withdrawn and not examined due to being the non-elected invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Diana J. Liao whose telephone number is 571-270-3592. The examiner can normally be reached on Monday - Friday 7:30am to 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DJL

VICKIE Y. KIM
SUPERVISORY PATENT EXAMINER